HJR 622 STUDY: CHESAPEAKE BAY PRESERVATION ACT - EXPANSION

RESOLVED FURTHER, That the Chesapeake Bay Local Assistance Department be requested to submit to the Commission for inclusion in Commission's interim report (i) **an assessment of the benefits to the environment, along with the costs and effects to state and local governments of extending the Act to include localities outside of "Tidewater Virginia" that are within the Chesapeake Bay watershed**; (ii) **the potential need for changes to existing regulations to reflect differences in the topography and geology for such an expansion; and (iii) the financial resources needed in the form of state implementation grants to local governments for such an expansion**. The Department shall complete and submit its findings and recommendations to the Commission by October 20, 2001.

IV. BENEFITS TO THE ENVIRONMENT

This chapter provides the assessment of the benefits to the environment associated with extending the Chesapeake Bay Preservation Act (the Act) to the balance of the Chesapeake Bay Watershed in Virginia. Initially, the task presented by the directive to "assess the benefits to the environment" appeared daunting. After all, the Commonwealth has a very comprehensive set of environmentally focused programs that were allocated over $235,992,000 in funds for fiscal year 2001. Of that, more than $35,000,000 is a conservative estimate of the amount directed toward non-point source pollution activities throughout the Commonwealth. In light of the magnitude of the existing commitment to protecting the quality of state waters, instead of assessing the benefits to the environment of expanding the concept of water quality protection which is the goal of the current Bay Act program, the study focuses more on the specifics of the Bay Act program's performance criteria and method of approach. In this way the assessment can be made that if expanding the territory under the Act is an effective, efficient, and appropriate way to protect and enhance the quality of state waters.

In order to focus upon the environmental benefits that might accrue specifically with the expansion of the Act, the content of this chapter addresses three areas. The first is the broad area of environmental protection as it relates to water quality. In essence, this material provides the framework for the analysis that occurs in the second part. The second part addresses each of the performance criteria contained in the Act and its Regulations along with the administrative activities that have an impact upon the environment. The third part of this chapter addresses the potential expansion with regard to the Chesapeake Bay 2000 Agreement.

The protection of the quality of state waters: There is a wealth of information that addresses this subject. The Chesapeake Bay Local Assistance Department (CBLAD) has issued such descriptive material as it specifically pertains to the Act. These include "*A Guide to the Bay Act*", the brochure "*Virginia's Bay Act Program*", and the recently published "*Working Together to Protect streams, Rivers, and the Bay*". A copy of each is contained in the appendices.

A complete description of the manner in which Virginia addresses the protection of the quality of state waters is found in the documentation that comprises the *Virginia*

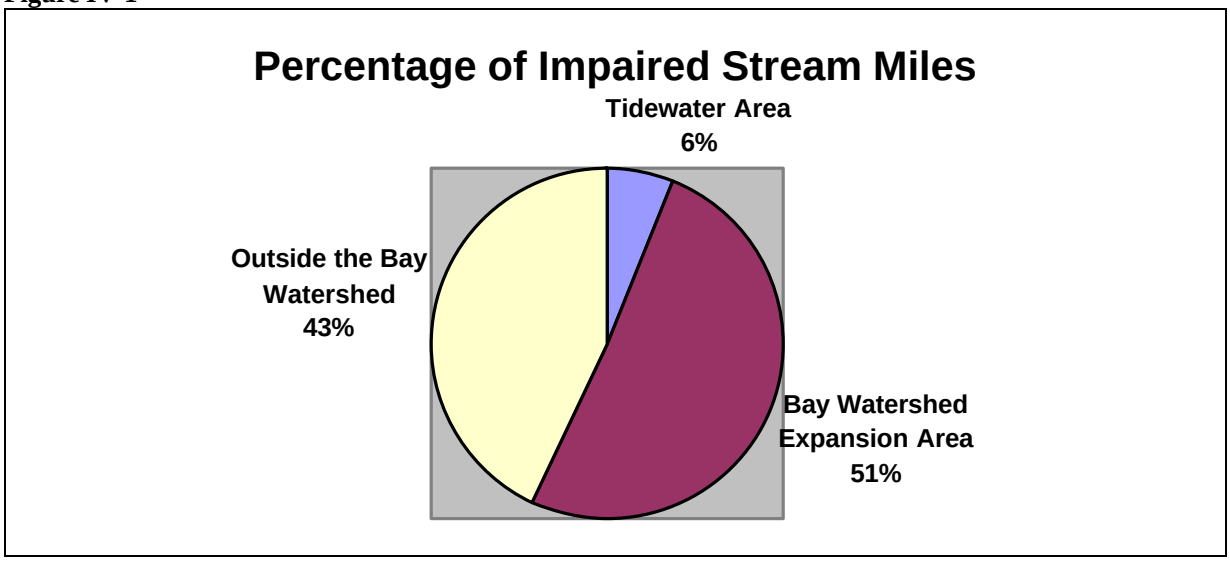
Nonpoint Source Pollution Management Program. This material is available in reports, is on the Department of Conservation and Recreation (DCR) website, and pertinent excerpts are included in the appendices to this study. In the material dealing with watershed prioritization, the following excerpts describe the relationship between water quality and land use. "Water quality degradation can result when polluted runoff from land use activities such as agriculture, forestry, and construction and development is introduced into surface and groundwater. These impacts can be characterized and addressed within a given watershed by assessing chemical, biological and physical attributes. Therefore, Virginia's pollution control efforts have to be targeted toward addressing sources of pollution on a watershed basis." "Commercial and residential development of land as well as agricultural and other land uses may cause the impairment of state waters through nonpoint source pollution. In the exercise of their authority to control land use and development, it is the responsibility of counties, cities and towns to consider the protection of all bays, lakes, rivers, streams, creeks, and other state waters from nonpoint source pollution. The exercise of environmental stewardship by individuals is necessary to protect state waters from nonpoint source pollution."

There are various approaches being taken in Virginia to address nonpoint source pollution. Most of the approaches are considered as voluntary. Under this category there is participation in the Bay Program and activities to meet its commitments, the tributary strategy program, the watershed forum and roundtable program administered by DCR, the stormwater management program, and various educational programs and studies undertaken primarily through grants. Other programs are mandatory. These include the total maximum daily load (TMDL) program that is tied to requirements of the federal Clean Water Act, the Erosion and Sediment Control program (E&SC), and the Bay Act program (i.e. the CBLAD program).

The Bay Act program was also Virginia's initial response to the 1987 Bay Agreement. It is a program of mandatory compliance regarding the relationship of land development and the protection of the quality of state waters. It not only provides for the protection of water quality during land disturbance but long-term protection through the establishment and/or maintenance of permanent buffers and water quality best management practices. The E&SC program deals with erosion control during construction and not with long-term impacts.

The next section of this chapter provides a brief description of the TMDL program within which there is a priority system for addressing watersheds that have needs to be addressed. The composite map [Figure 3.4-16, 305(b) Report, 2000], affixed to the end of this chapter, shows a far greater number of high ranking watersheds in the proposed expansion area and outside the Bay Watershed as opposed to the Tidewater Area where the Bay Act program has been in effect for twelve years. Figure IV-1 shows the relationship of miles of impaired streams among these three areas of the Commonwealth. When considering the relative percent of land (Figure V-1) and relative amount of population (Figure V-2) among the three areas, it appears that the existence of the mandatory Bay Act program with its requirements for local controls has had a significant impact upon protecting, and enhancing, the quality of state waters.

Figure IV-1



Environmental Framework: The concluding statement in *The Primary Problem* portion of the *Save Our Rivers Report* reads "The majority of the pollution in the Chesapeake Bay comes directly from the rivers and streams in the watersheds that empty into the bay. **To save the bay, therefore, we must also save the rivers!**" This statement clearly emphasizes that any evaluation of a program that is directed toward protection of the Chesapeake Bay must deal with the total integrated system of the bay, its tributaries, and the streams that feed the tributaries. This concept is reinforced by numerous articles and reference documents, examined for this study, that frame the issue as "saving the Bay by saving watersheds." With that concept in mind, a suggestion was made during the course of the study that if a new program were created for the proposed Expansion Area it should be along the lines of "The Chesapeake Bay Rivers Act/Program." It was also noted that the language of the current Act addresses the protection of the quality of state waters and does not refer specifically to the Bay except in connection with the rivers that feed it.

The following subsections of this chapter highlight the framework that exists in the Commonwealth for protection and enhancement of the water of the state. It is not the intent of this material to be totally descriptive of the referenced programs, rather it is meant to provide an overview of the activities that exist. Also, rather than providing extensive text, reference is made to source documents, and excerpts are included in the appendices to this report.

Virginia's Nonpoint Source Management Program (VNSMP): As noted in Chapter Two, the Clean Water Act establishes, among other items, the basis for water quality standards in Virginia. Section 319 of the Act requires states to assess their state waters and identify those that are adversely affected by nonpoint sources of pollution. The DCR website (www.dcr.state.va.us/sw/docs) describes *Virginia's Nonpoint Source Management Program*. A copy of the *Program Background* section in included in the appendices.

Tributary Strategies: The tributary strategies are an approach that has been used in the NPS program for the past ten years to address the issue of protecting the Bay by reducing the nutrient flow from streams, to tributaries, to the Bay. A significant part of these plans deal with point-source pollution. Tributary strategy plans were created for seven water basins. During the course of their development, the influence of sediments has become more apparent and some of the tributary strategies are directed toward sediment control. Both the VNSMP and the Secretary of Natural Resources 2001 Report on implementation of the Bay Programs 2000 Agreement commitments provide current descriptions and status reports on the tributary strategy program. The Water Quality Improvement Act's Fund (WQIF) is the principal tool for funding and implementing the conservation practices identified in the strategies. While significant funding was provided in the early years of the fund, only minimal funding was provided for fiscal year 2001 and in all the years the majority of the funding went to point source pollution control activities.

In most of the strategies the focus for non-point pollution was upon agricultural best management practices and agricultural nutrient management planning. While that emphasis appeared adequate to help reduce nutrient loading, the next challenge had to deal with increased NPS associated with development practices. In some parts of the proposed Expansion Area there was concern with the implications of maintaining the "cap". In response, DCR instituted "roundtable" programs in the Shenandoah and Potomac watersheds. In other areas, "forums" have been created as a part of a watershed planning initiative.

In the outreach meetings, held for this study, there was frequent comment about confusion associated with the tributary strategy program. This was attributed, in part, to the lack of funding and implementation, but also to a shift in the Bay Program goals from nutrient reduction to environmental end-points (see later subsection re this change). While voluntary and education-based programs as addressed in the tributary strategies and as being carried-out through roundtables and forums are laudable, it has always been acknowledged that the failure of such efforts to actually be reflected in water quality improvement and maintenance would probably lead to mandatory programs. Such an outcome is becoming evident as the Commonwealth is working under federal mandates in the TMDL program. Given the apparent success of the Bay Act program's approach along with the acknowledgement that maintaining the "cap" is a main challenge of the NPS program, it appears that expansion of the Bay Act program is appropriate, logical, cost effective and may become inevitable.

Water Quality Improvement Act Fund: As stated above, the Water Quality Improvement Act's Fund (WQIF) is the principal tool for funding and implementing the conservation practices identified in the strategies. Information on the WQIF is available on the web at www.dcr.state.va.us/sw/wqia.htm. The following two paragraphs are from the web-site description of the Act and its Fund.

"The purpose of the Virginia Water Quality Improvement Act of 1997 (WQIA) is to restore and improve the quality of state waters and to protect them from impairment and destruction for the benefit of current and future citizens of the Commonwealth of

Virginia (Section 10.1-2118 of the Code of Virginia). Because this is a shared responsibility among state and local governments and individuals, the Water Quality Improvement Fund (WQIF) was created. The purpose of the fund is to provide water quality improvement grants to local governments, soil and water conservation districts and individuals for point and nonpoint source pollution prevention, reduction and control programs (Section 10.1-2128.B. of the Code of Virginia).

A primary objective of WQIF is to fund grants that will reduce the flow of excess nitrogen and phosphorus into the Chesapeake Bay through the implementation of the tributary strategies. The Virginia Department of Environmental Quality (DEQ) is responsible for administering point source grants, and the Virginia Department of Conservation and Recreation (DCR) administers nonpoint source grants."

The FY 2001-02 biennium budget included a $10.3 million General Fund appropriation for the WQIF Cooperative Point Source Program, plus $2.7 million in reallocated interest from the Fund. Therefore, a total of $13 million in funds was made available for point source nutrient reduction projects in the Chesapeake Bay drainage. The amount of funding that is directed toward NPS projects is relatively small compared to the total allocation that has been made to the WQIF. Table IV-1 shows the allocation for NPS projects over the life of the WQIF along with the appropriations for the point source program.

Table IV-1 WQIA (NPS) Project Fund Allocations							**Point Program**
Fiscal Year	***Number of Awards***			***Funded Amount***			***Appropriations*** *(does not include interest)*
	Ches Bay	***Southern***	***Total***	***Ches Bay***	***Southern***	***Total***	
1998	16	18	34	$1,037,458	$1,527,975	$2,565,433	$10,000,000
1999	26	6	32	$2,825,000	$ 500,000	$3,325,000	$37,100,000
2000	21	13	34	$1,522,000	$1,000,000	$2,522,000	$25,240,000
2001	17	15	32	$1,000,000	$1,000,000	$2,000,000	$10,300,000

Figures IV-2 and IV-3 show the allocation of the WQIA NPS Project funding within the Chesapeake Bay Watershed for fiscal years 1998 and 2001 broken into general categories. The categories are: Septic Systems (Septic), Stormwater management and projects (STMW), Mined Land Reclamation (MLR), Watershed Restoration (WSR), Streambed Stabilization (Stream S), and Agriculture (Ag) including poultry programs. The allocation for each year was approximately the same with $1,037,458 in 1998 and $1,000,000 in 2001.

Figure IV-2

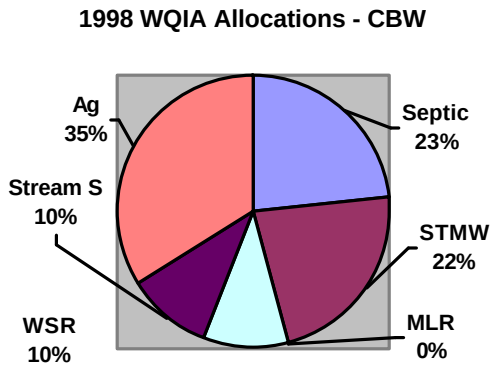
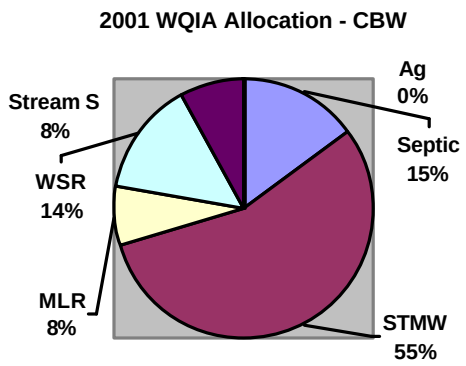


Figure IV-3



The distribution of the grant awards has matured along with the program with the 2001 allocations reflecting the types of projects identified in the tributary strategies minus the agriculture component. However, as can be seen in Table IV-1, the amo unt of funding is not great. Given that the voluntary tributary strategies program is highly dependent upon the WQIF for implementation and given that the funding has been limited (there is no dedicated funding source other than 10% of budget surpluses, when they exist), it should be re-examined in its role as being a major approach in protecting the quality of state waters.

Stormwater management programs - - In general there are four types of stormwater management programs in the Commonwealth. These are programs associated with the mandatory National Pollutant Discharge Elimination System (NPDES), those mandated under the Bay Act and its Regulations, and optional/voluntary programs developed under the Virginia Stormwater Management Law (§ 10.1-603.3) (VSML), and individual programs developed by localities to meet their own needs and adopted under general enabling legislation. The locality survey relates that 29% of the expansion counties have some sort of a stormwater management program with about 50% of those addressing water quality. The corresponding figures for cities is 55% and 100%; and for towns, 36% and 75%. There are 11 Phase I, NPDES localities. There are 43 "automatically" designated and 10 "potentially" designated Phase II NPDES localities. All of the 84 localities categorized as "Tidewater Virginia" have stormwater management programs that address the water quality requirements of the Bay Act. There are only five localities outside the Tidewater Area that have opted to incorporate stormwater management under the VSML.

The federal Clean Water Act enables the U.S. Environmental Protection Agency to authorize the states to implement certain EPA responsibilities. One of these responsibilities is the authority to issue National Pollutant Discharge Elimination System permits. EPA has authorized Virginia to issue NPDES permits. These permits, when issued by Virginia, are called Virginia Pollutant Discharge Elimination System permits. These permits carry the weight of both federal and state laws and regulations, and are enforceable under both state and federal authority.

Under the VPDES Stormwater Regulations, the local stormwater programs in municipalities subject to Phase II compliance must satisfy six minimum control measures. The six minimum control measures are:

- Public education and outreach of stormwater impacts
- Public involvement/participation
- Illicit Discharge Detection and Elimination
- Construction site stormwater runoff control
- Post-construction stormwater management in new development and redevelopment
- Pollution prevention/good housekeeping for municipal services

The local Bay Act Programs fulfill the requirement for post-construction stormwater management and also fulfill the construction site stormwater runoff as a part of E&SC performance criteria. The CBLAD program has also been effective in providing resources and guidance in the components dealing with public involvement, education and outreach.

However, a locality operating under the VPDES program does not necessarily meet the requirements of the Act and its Regulations. The VPDES MS4 requirements and the CBPA pollutant removal requirements are not, currently, interchangeable. While they may require similar management practices, the VPDES MS4 permit requirements affect only MS4's within Urban Areas as designated by the census, and the CBPA water quality requirements affect only Chesapeake Bay Preservation Areas. While there may be overlaps between these areas, they are two distinct and separate overlays that many localities have kept as such. The VPDES MS4 program a flexible program based on a wide variety of BMP options that localities may choose to implement. However, the lack of definitive performance requirements in the VPDES program makes a broad programmatic determination of equivalency impossible.

If a locality chooses to implement water quality criteria which accomplish the same desired pollutant reduction through a vehicle other than their Chesapeake Bay Preservation Act program, such as a VPDES MS4 program, then they are allowed to do so provided the Board has reviewed such a request and found them to be implementing equivalent measures to what is minimally required by the Chesapeake Bay Preservation Act. Within Tidewater several localities have adopted comprehensive revisions of their stormwater programs resulting in municipal regional stormwater programs that provide equivalent water quality protection through a different control approach than on-site BMPs. This is encouraged and the language revisions in the currently proposed changes to the Regulations are intended to be supportive of such efforts. The equivalency provision is not intended to be extended to VPDES construction general permits, as the statewide general construction permit do not, in practice, require that permittees address post-construction stormwater pollutant loadings through the application of stormwater management Best Management Practices.

Total Maximum Daily Load(TMDL) Program: As with the other programs, there is a wealth of information on the TMDL program both on federal (EPA) and state (DEQ) websites. The following brief description of the organization of the Virginia programs is from the DEQ TMDL website, http://www.deq.state.va.us/tmdl/backgr.html.

" DCR is authorized to administer Virginia's nonpoint source pollution reduction programs in accordance with §10.1-104.1 of the Code of Virginia and §319 of the Clean Water Act. EPA is requiring that much of the §319 grant monies be used for the development of TMDLs. Because of the magnitude of the nonpoint source component in the TMDL process, DCR is a major participant the TMDL process. DEQ and DCR have signed a Memorandum of Understanding agreeing to a cooperative effort in the TMDL process including Implementation Plan development. Specifically, DCR agreed to assume responsibility for the nonpoint source component of all TMDLs, with the exception of mineral extraction, including the final allocations. This includes those TMDLs contracted by DEQ. Also, DCR agreed to present the nonpoint source component of the TMDLs in the public forums. Another major role DCR has in the TMDL process is the awarding and managing the contractual services for the development of TMDLs related to nonpoint sources."

A first step in the overall TMDL program process is development of a list of "impaired" water bodies. This list exists in the 303(D) TMDL Priority List and Report prepared by DEQ and DCR. The reports that were prepared received public comment to the effect that they were not easily understood. To address this problem, Friends of the Rivers of Virginia (FORVA) prepared a more user-friendly report, the *State of Our Rivers Report, for the Commonwealth of Virginia, January 2001*. The FORVA report identifies the TMDP program as a powerful tool and when "used properly, TMDLs can play a critical role in the battle against water pollution problems."

Another report is the *Nonpoint Source Assessment Report* prepared by DCR. Among other information it provides rankings that are used to direct implementation of NPS control programs as well as cost-share and Section 319 funding to the highest priority watersheds - watersheds with the greatest pollution potential (*Virginia Nonpoint Source Pollution Management Program, Background Document*). Overall, the greatest number of high priority TMDL watersheds are in the proposed Expansion Area. While the Bay Act Program is cited in the NPSPMP report as one of the strategies for meeting TMDL standards, it is not applied in those western watersheds. The expansion of the Act to those watersheds becomes even more of a necessity when it is acknowledged that the current thrust of TMDLs focuses upon agricultural pollution sources and do not address how to address long-term mitigation for NPS after there is a transition in land use from agriculture to development. Perhaps the fact that the Bay Act program has been in effect for twelve years and does address such matters is one of the reasons that the Tidewater Area does not have a great number of high priority watersheds. Also, as shown in Figure IV-1, the number of miles of impaired streams in the Tidewater Area is significantly less that in the Expansion Area even though there is a significantly higher degree of population concentration and man-made activity that contributes to nonpoint source pollution.

The Role of Headwaters: During the course of this study, information about the role of headwaters in nutrient removal was published in Science, Vol. 292, April 6, 2001 in the article *Control of Nitrogen Export from Watersheds by Headwater Streams*. The general conclusion of the study was that smaller streams remove more nutrients such as nitrogen from water than do their larger counterparts. This new focus upon the relationship between the size of a stream and how rapidly that stream removes nutrients presents another dimension to the NPS issue – one that is not addressed in existing NPS programs with the exception of the Bay Act program. Currently proposed changes in the Regulations refine the designation criteria as it applies to streams to include all streams with perennial flow. With this change, application of the Bay Act program to the balance of the Chesapeake Bay watershed, where the headwaters exist, should have a significant impact upon maintaining long term water quality especially as those lands become subject to development.

Excerpt from *Control of Nitrogen Export from Watersheds by Headwater Streams*, Science, Vol. 292, April 6, 2001

"A comparative N-tracer study of nitrogen dynamics in headwater streams from biomes throughout North American demonstrates that streams exert control over nutrient exports to rivers, lakes, and estuaries. The most rapid update and transformation of inorganic nitrogen occurred in the smallest streams. . . Despite low ammonium concentration in stream water, nitrification rates were high, indicating that small streams are potentially important sources of atmospheric nitrous oxide. During seasons of high biological activity, the reaches of head-water streams typically export downstream less than half of the input of dissolved inorganic nitrogen from their watersheds."

Flood plains and water quality protection: Historically flood plain regulations have focused upon minimizing damage to property that is built in flood plains. This was commonly accomplished by insuring structures were built higher than the level of inundation. This approach is still the major, if not the only, function of flood plain ordinances in most localities. An adverse consequence of this approach is that of increasing the velocity of flow and resulting damage to streambeds. Streambed damage is often corrected through structural devices that inhibit overland sheet flow and result in channelization of stormwater and the direct deposition of pollutants into the streams. Thus, the historic approach has resulted in increased sedimentation and interruption of historic flow through natural filters.

There is now more focus upon treating flood plains in a manner that protects its hydrologic function instead of only addressing damage control. This concept is encouraged by CBLAD in its review of local comprehensive plans in which, pursuant to the requirements imposed by the Board, the treatment of flood plains must be addressed since they are a component of the resource management area designation.

In the proposed Expansion Area, the characteristics of flood plains are substantial different from many of the Tidewater localities where flood plains are tidal influenced. The filtration aspect of the RPA buffer applies with respect to those streams that are in steeper terrain and help with minimizing the adverse impacts associated with development in flood plains. With valley streams in the proposed Expansion Area, there

is a need to look at the flood plain as a RPA feature since in those situations the adverse impacts described above are most likely to occur.

The Bay Agreement and New Perspectives on Water Quality: As stated in the *Virginia Nonpoint Source Pollution Management Program, Background Document*, the "federal Chesapeake Bay Program is another vital component of Virginia's Nonpoint Source Pollution Management Program." The existing Bay Act program is Virginia's direct response to that federal program. However, the federal program encompasses all of the watershed whereas, the Virginia Bay Act program only applies to the those localities defined as Tidewater Virginia and which, essentially lay along, and to the east of, the I-95 corridor, North of Petersburg.

Virginia's response to the 1987 Bay Agreement commitment for a program that addresses the relationship between land use and water quality is the Chesapeake Bay Local Assistance Act, its Regulations, and the program operated by CBLAD. The Regulations and CBLAD program are based upon guidance issued by the federal program's executive council, except for the fact that it does not cover the entire watershed. Expansion of the Act would fulfill that initial commitment.

The 1987 Bay Agreement also established a numerical nutrient reduction goal. At that time, the numerical goal became a driving force in the overall program and provided the impetus for activities such as the tributary strategies described previously. The Department of Conservation and Recreation, as the designated recipient of federal nonpoint source grants for the state, has also taken on the role of coordinating Bay Agreement commitment activities. This includes administering the approximately $2,500,000 annual Bay Agreement Implementation Grant.

In 2000 a new agreement was executed – *Chesapeake 2000: A Watershed Partnership* (*C2K*). It built upon the 1987 Agreement and became increasingly complicated as it creates direct linkage to the TMDL aspect of the Clean Water Act (see previous discussions). It is anticipated that the approach adopted in *C2K* will eliminate the need to establish TMDLs for the Bay and the estuarine portions of its tributaries. *C2K* also moves into major new areas with the addition of a large number of commitments that are directed toward minimizing the negative effects of regional growth and development.

Table IV-2 lists those commitments in the Chesapeake Bay 2000 Agreement that have direct applicability in the proposed Expansion Area. Many reflect the type of work that is accomplished under the current Bay Act program operated by CBLAD. Thus, expansion of the Act will greatly assist in meeting those commitments, particularly where they apply to category 4, sound land use. As discussed in Chapter VII, the federal financial resources that are provided to Commonwealth to help in meeting the commitments could assist in meeting the costs of the expansion through a reallocation of priorities.

With *C2K* the measure of success has shifted from the nutrient reduction numerical goals to environmental end points. This also signals a shift in program focus from water

quality clean-up to looking at the long-term impacts of land use upon water quality. This has been characterized as going from a "gap" strategy to a "cap" strategy.

Table IV – 2 ***C2K Commitments***

*{Those marked * are on a list, compiled by the Chesapeake Bay Program's Local Government Participation Action Plan Review Team, showing those that require local* government implementation and communication.}

Vital Habitat Protection and Restoration

2.2.1* Watershed management plans in 2/3rd of the watersheds with a focus on stream corridors, riparian forest buffers and wetlands
2.2.5* Development of stream corridor restoration goals (based on 2.2.1)
2.3.1 Achieve a no-net loss of existing wetlands acreage and function . .
2.3.1.2.1 Achieve a net resource gain by restoring 25,000 acres of tidal and non-tidal wetlands
2.3.3.2* Implementation of wetland plans on 25% of the land area . . .
2.4.1.1* Meet the riparian forest buffer restoration goal . . . .
2.4.2* Conserve existing forests along all streams and shorelines
2.4.3* Promote the expansion and connection of contiguous forests through conservation easements, greenways, purchase and other . . .

Water Quality Protection and Restoration

3.1.1* Continue to achieve and maintain the 40% nutrient reduction goals
3.1.2* Correct nutrient and sediment related problems – Bay and tributaries
3.1.3 Revisions to tributary strategies and their implementation
3.2.3* Reduction of chemical contaminants

Sound Land Use

4.1.3.3* Permanently preserve from development 20% of watershed land area
4.1.4* . . conservation and sustainable use of forest and agricultural lands
4.2.1* 30% reduction of harmful sprawl from forest and agricultural lands
4.2.2* Remove LID impediments and encourage use of LID
4.2.3* Encourage sound land use and planning practices
4.2.4* Tax Policy impacts
4.2.5* Promote redevelopment, remove barriers to reinvestment
4.2.6* Tools for watershed based assessments
4.2.7* Eco-based designs to result in lower impervious coverage
4.2.8* Provide information to the development community and others
4.2.9* Approaches to concentrating new development in areas with APF and with adequate water supply
4.2.10* Evaluation of local water quality programs (E&SC, stormwater)
4.2.11* Develop and promote wastewater options
4.2.12* Brownfield redevelopment
4.2.13* Urban storm water retrofits
4.3.1* Promotion of transportation and land use planning . . .
4.3.3 Opportunities for purchase of easements . . . and special stormwater management efforts re rights-of-way and transportation projects
4.4.1* Expand system of public access . . . in an environmentally sensitive manner . .

Stewardship and Community Engagement

5.1.x* Education and outreach
5.2.x* Community outreach
5.2.1 Identify small watersheds where community-based actions are essential . .
5.2.2 Enhanced funding for locally-based programs that pursue restoration
5.2.4 Offer easily-accessible information for analyzing . . . small scale watersheds
5.2.5 Strengthen the CB Program's ability to incorporate local governments into . . .

This shift is consistent with the trending state of the art in water quality programs. An article in the September 2001 issue of *Bay Journal* reports the National Academy of Sciences, through its National Research Council, issued a report in June 2001 stating that the nation's water quality programs should focus on the biological health of waterways rather than on setting effluent standards for dischargers, which has been the focus of the Clean Water Act for most of the last three decades. In the Chesapeake 2000 Agreement, the EPA and the Bay states agreed that the old water quality standards for the Chesapeake should be replaced by new ones that work "support the aquatic living resources of the Bay." The new water quality standards divide the Bay into a series of designated uses, such as spawning habitats, shallow water habitats for grasses, open water habitats for adult fish, and so on. New criteria will be applied to each designated use based on the needs of the species using those areas. Instead of a one-size-fits-all dissolved oxygen criteria, three new criteria are being developed. New oxygen criteria are aimed at ensuring that adequate amounts of oxygen are available in the right place at the right time. In some places, that means oxygen levels will be higher than required today; in other places, it will be lower. Also, a new water clarity criteria will ensure that important underwater grasses get enough light to grow, while chlorophyll criteria are aimed at regulating the amount and types of algae in the Bay. PP Once the standards are set, the Bay Program will determine the amount of nutrient and sediment reductions needed to reach the criteria for each designated use. The Chesapeake would not be considered "cleaned up" until those water quality standards are attained. . . . . Historically, the report notes, states and the EPA have measured success based largely on the setting of effluent limits in permits for industries and other dischargers, and then measuring whether those limits are met. Such an approach was useful to start the clean water program when there was often not enough information available to set goals based on aquatic life needs, the report said. . . . But the report said the effluent limit approach has frequently failed to clean up waterways because it focused on individual facilities, rather than looking at the cumulative impact of all activities on a waterway, including pollution from runoff. As a result, many of the nation's waterways remain polluted. . .. Instead, the report said "the data and science have progressed sufficiently over the past 35 years to support the nation's return to ambient-based water quality management." In such a program, the total amount of pollution must reduced, and "success is achieved when the condition of a water body supports its designated use."

The comprehensive plan requirements and innovative land design strategies (see next sections) that are applied by CBLAD in its current program already focus on the new change in direction of the federal Bay Program. Accordingly, not only does expansion of the Act fulfill the 1987 commitment, it also will provide the leadership and expertise to carry forth in meeting the *C2K* commitments throughout the watershed. In addition, its successful liaison, technical assistance, and education programs provide a framework that can easily be expanded to encompass the new territory.

Low Impact Development: Low impact development has been around in some form for many years. It takes forms from conservation subdivisions, to open space and cluster development, to incorporation of stormwater management practices that protect water

quality by replicating the natural hydrologic function of a development site. CBLAD has pioneered low impact development concepts in the Commonwealth and has been designated by the Secretary of Natural Resources as the lead agency for such concepts and programs. In 2000, CBLAD published the report *Better Site Design – An Assessment of Better Site Design Principles for Communities Implementing Virginia's Chesapeake Bay Preservation Act.* In addition, CBLAD is currently engaged in a study of impediments to implementing better site design practices. It is also involved in the examination of urban best management practices particularly as they relate to more "natural" as opposed to structural stormwater best management practices.

Application to the proposed Expansion Area:

The drafters of HJ 671 recognized that the task of expansion would not be as simple as adding the names of western watershed localities to the Bay Act. Thus, one of the required outputs of this study is to identify "the potential need for changes to existing regulations to reflect differences in the topography and geology for such an expansion". Any geographic and topographic map of Virginia clearly delineates Tidewater Virginia - its marsh lands, shorelines, and tidal influenced rivers - from the western portion of the watershed where karst topology dominates. Karst topology occurs in regions that are characterized by formations underlain by carbonate rock typified by the presence of limestone caverns and sinkholes. The most important current and future environmental issue with respect to karst is the sensitivity of karst aquifers to groundwater contamination. A report, *Living With Sinkholes*, describes karst topology and associated water quality and environmental problems. A copy of the report in contained in the appendices. Some information from the report that is pertinent to this study follows.

Mankind has only recently become aware of how environmentally sensitive karstlands can be. Sinkholes, in particular, pose several problems that ultimately affect groundwater in karstic terrain. Unlike other types of terrain, groundwater in karst regions is channelized within the natural groundwater system of interconnected "pipes" that collect water from input (recharge) points to output (discharge) points. Discharge occurs in two ways. One is through natural springs as caves streams exit from openings or as seeps. In either event, the groundwater now becomes surface flow and carries with it any pollutants that entered through sinkholes. This is because karstic aquifers can not filter contaminated groundwater sufficiently to render it potable at a discharge site. The other discharge occurs through uptake in wells. Man-made changes to drainage on the surface or to sinkholes may easily alter the rate at which the underlying aquifer receives it normal recharge. Vegetation slows runoff from storms and allows water to percolate into the soil. However, runoff from impermeable materials (such as those associated with development) may rapidly be funneled through sinkholes into the aquifer. Artificially filled sinkholes may become blocked inputs. Increasing the rate of runoff and/or blocking input points may cause surficial water to pond or flood, unless it is diverted away from its natural sink point (thereby altering the recharge to yet another sink point). This may drastically affect the amount of groundwater available for use in the immediate vicinity.

The problems with karst topology are being addressed by the legislative through HJ 161 and the work of the State Water Commission. The nature of karst, particularly the sinkhole feature, suggests that it be considered as an environmentally sensitive feature that should be subject to use and development regulations such as those currently imposed through the Bay Act program.

At the outreach meetings conducted with this study, other items were identified whereby there would be environmentally related benefits to localities. One dealt with the quality of the raw water supply. It was stated that it would be easier and less costly to treat the water for consumption if it were in better condition. Besides protection of sinkholes, from pollutants, examples were provided where counties were involved in septic pump-out programs that focused upon lands adjacent to their water supplies. These programs were corrective in nature and made use of WQIA funding. See Figures IV-2 and IV-3.

On the other hand, locals pointed out that the present program's approach of identifying areas "unsuitable for development" due to soil characteristics may create other problems in some parts of the proposed Expansion Area. In these areas there are clay-like soils, unsuitable of septic systems that encompass entire counties. They did not wish to see a classification of "undevelopable" applied to them especially as it might put up an additional barrier to economic development and another hurdle to be overcome. However, the program's new emphasis on alternative methods of compliance, that would include acceptance of alternative septic systems that can work in their environment, was viewed favorably and as a way to work better with the Department of Health on such matters.

Also at the outreach meetings, questions were raised about what does the "Bay Act", which is perceived as cleaning up the Chesapeake Bay, have to do with the western area. This general topic was addressed by relating the changes to the Bay Program and the shift from numerical goals to the environmental end-points approach. It was also addressed through discussion about the "cap" nature of the Bay Act program, as opposed to the "gap" nature of the activities that they were more familiar with through the initial tributary strategies and TMDL activities. But the most appropriate response was put forth by participants themselves as they described the whole water quality issue as a puzzle with needing to make each piece of the puzzle self-organizing and optimized at each level. This would have a cumulative effect that reaches the goal. In other words, describe the "system" - - agricultural and forestry enhancement, stormwater enhancement - - each doing its part and resulting in better quality. But the most favorable aspect of a potential expansion was that there is a need to address, and emphasize, local water aspects of the program and the assistance that it can bring to addressing those local needs.

***Designation and performance criteria to be applied through an expansion of the Act and its Regulations*:** The following section of this Chapter uses the information from above along with knowledge of the current Bay Act program to address the increments of change that are anticipated with an expansion of Bay Act program and the resulting environmental implications. Please refer to Chapter III for a review of the methodology. A similar analysis is provided in Chapter V regarding the effects upon local government.

Designation Criteria: The designation of the Resource Protection Area (RPA) and the Resource Management Area (RMA), as it applies to the proposed Expansion Area, will be one of the most difficult aspects associated with expansion of the program. The RPA is defined as areas at, or near, designated state waters that are sensitive lands requiring protection. The RMA is an area that has an intrinsic relationship to the quality of State waters and that is to be identified and managed in a comprehensive manner. There will be difficulty in applying the current RPA and RMA criteria, and hence designations, in the western area due to the steep slope topography, the karst topology, the character of streams, and the character of isolated wetlands along with the fact that most of the Tidewater criteria, e.g. tidal shores, etc. don't apply.

The resulting criteria will need to be developed through a stakeholders process as was done for the initial (1989) Regulations. Also, attention needs to be paid to the ability to easily map and use resulting designations in order for them to be truly meaningful and to have a positive effect upon enhancing and maintaining water quality. Once this process is complete it is evident from the content of this report that the results from this type of planning approach show enhanced environmental quality in localities.

Erosion and Sediment Control (E&SC) Compliance Threshold: The change that will occur with applying the E&SC criteria is simply that the threshold for compliance will change. The change will be from 10,000 square feet for earth disturbance to 2,500 square feet.

The basic effect of applying this criteria is that more land will be subject to E&SC controls, thus reducing the amount of sediment that enters waterways. Since the tributary strategies and other reports show that sediment is a primary factor in the decline in the health of water quality, reducing sediments will be a beneficial effect.

Identifying an exact increment of benefit however is impossible, as was expressed in the DPB report when it addressed this issue in its assessment of the proposed changes to the current Regulations. That report stated "there do not appear to have been any studies to measure the actual changes in erosion and sediment in the Chesapeake Bay watershed resulting from the current application of this performance standard. The data do not exist to determine whether this standard results in cost effective reductions in sediment load."

While the E&SC law that already applies in the proposed expansion area has the 10,000 square foot threshold, information from the locality survey shows that some localities already apply a threshold that is less than 10,000 square feet.

Table IV-3	***Expansion Localities and E&SC Thresholds***			
Jurisdiction Type	Number	Sample	# with < 10,000	% < 10,000
Cities	11	8	4	50%
Counties	36	29	2	7 %
Towns	57	19	9	47 %

Stormwater Quality Management: The change that will occur is that a local stormwater quality management program will be required. The minimum effort is the establishment of pollution run-off standards and use of best management practices that address water quality. Establishment of local watershed defaults is an optional component of a local program. While fewer than 50% of the localities that responded to the locality survey said they had a stormwater management plan, slightly more than ½ of those plans addressed water quality specifically. A few localities that will be subject to the Phase II VPDES program will need to address water quality in the future. As with the E&SC criteria, some localities are taking some actions, thus it is impossible to provide a succinct quantitative determination of the increment of change. Enhanced water quality is achieved by meeting the standard that there is no net increase in the pollution that leaves a site and by achieving a reduction when the activity involves redevelopment. This places a cap upon the ability to further degrade the quality of state waters.

A BMP maintenance program that provides for inventory and tracking of maintenance is also required through the current criteria. These programs provide a mechanism for assuring that BMPs continue to work properly and the pollutant reduction targets are met.

Another increment of change will be that localities, once faced with a requirement to undertake a stormwater management program – and when provided with resources and technical assistance to do so – may well do it, not in a strictly technical and structural approach, but will use the better site and low impact development approaches advocated by the current program. Also, they may well address their stormwater management issues by developing a regional or watershed based approach. These approaches have been used in Tidewater and have been developed with technical and financial assistance from the current program. The value of addressing stormwater management is well documented in the Virginia Nonpoint Source Management Program report, Bay Program materials. Please see the appendices for reports and references.

***Septic System Criteria*:** The change that will occur with an expansion of the current program is that localities must have a program to insure compliance with the septic pump-out requirement. The increment of change, again, is not quantifiable however, HJ 771 provides the statistics that the Commonwealth has more than 750,000 septic drainfields that will fail with age, positing a serious threat to the environment. It also states that there are more than 30,000 homes without indoor plumbing and unknown numbers of straight pipe discharges (raw sewage) into state waters. The problem of ineffective septic systems is being addressed through the awarding of grants (see Figures IV-2 and IV-3), but this occurs on a piecemeal basis. Through expansion of the program, a systematic approach will be applied that requires an inventory and a tracking system. Local septic pump-out programs developed under the Act and its Regulations also have included extensive public awareness programs that also appear to be very effective in minimizing the adverse impacts of development that occurs on septic systems.

A properly implemented program results in a reduction of nitrogen loading and the amount of pathogens and toxics that reach state waters. Septic pump-out and repair

programs present a primary strategy in the clean-up of streams. In addressing this matter, the environmental benefits focus group identified a list of benefits. These benefits, provided in an outline format, included:

Fewer faulty systems result in:

- Improved water quality
- Increased recreational benefits
- Protection of public health when there is exposure to water e.g. playing in streams
- Reduction of exposure to human viruses and pathogens

Having an inventory of septic systems is a good practice -

- Finding something else when doing conducting it e.g. "straight pipes"
- The inventory provides a useful management tool
- An added benefit is economic in that it establishes small business relationship i.e. regular pumping provides for regular business

Other considerations identified by the focus group included:

- Prevention of (public) money being spent on the repair of systems;
- The local situation (water quality) may not be much of a problem but the problem occurs during storm events with fecal matter carried into streams;
- Well contamination studies show the biggest potential source is a failed septic systems;
- There is an impact on water *supply* when individual wells are affected.

Addressing the environmental benefit of the current program's septic system requirements, needs to be put in the context that when the current program was created there were no other programs or activities that specifically addressed this subject. As shown through HJ 771 there is a heightened level of interest and activity at this point in time and, perhaps, the Departments of Environmental Quality and of Health will create a more far-reaching program. If that becomes the case, the criteria and requirement of the Bay Act program could be rescinded; however, until that time it is appropriate to continue with, and expand this criteria.

***Agriculture*:** The changes that will occur with regard to applying the agriculture related criteria are three-fold. The overall goal of this layered approach is to reduce the amount of non-point source pollution that enters local waters and ultimately the Chesapeake Bay. One aspect of the program is that the type of plan that is prepared for farm operations is more comprehensively water quality focused as opposed to a standard nutrient management plan or a standard farm bill plan. Another change is that a priority is established for the funding and preparation of plans that are in the most environmentally sensitive areas (i.e. parcels where there is a RPA designation). The third change is that farming operation must respect the buffer component of the RPA.

The practice of using environmentally based planning for the conduct of farm operations is well based in federal law, state programs, and basic good stewardship. Through state and federal sources associated directly with the Bay Program more than $550,000 is spent annually on the preparation of such plans. In addition, there is the NRCS program that also prepares farm plans. To better address the increment of change, the following provides more detail about the soil and water quality conservation plan (SWQCP) that is required under the current Bay Act program.

In short, a SWCCP addresses (note links to websites that provide additional detail):

- Soil Management
- Nutrient Management
- Integrated Pest Management

There is a difference between the SWQCP and what is known as a Farm Bill Plan. The United States Dept. Of Agriculture's Natural Resources Conservation Service (NRCS) requires a that a Farm Bill plan be prepared if a farmer wishes to receive any USDA program benefits, e.g. low interest loans, price supports, commodity loans, etc. The plan provides the appropriate conservation measures on any cropland (not pasture) that is determined to be highly erodible and which the farmer must implement as a condition of receiving assistance. These Farm Bill plans, generally, address soil erosion. Soil erosion is but one part of a Soil & Water Quality Conservation Plan. The other two aspects are: Nutrient Management and Integrated Pest Management.

In Virginia, the DEQ has its Virginia Pollution Abatement (VPA) permit system, that requires producers with lots of animals to have a VPA permit of which a nutrient management plan is a part. Additionally, the Soil and Water Conservation Districts manage cost share funds, allocated by DCR. These funds are used to promote voluntary implementation of agricultural best management practices.

As with the septic system component of the current program, it is appropriate to look at the context in which the agriculture criteria was initially considered as a component of the Act. Prior to the Bay Act, there existed a system to deliver the conservation message to local farmers. This system, which traces its origins back to the post Dust Bowl era, consists of two government sectors working together. They are the Natural Resource Conservation Service, "NRCS," and the local Soil and Water Conservation District, "SWCD." These two agencies have worked in unison to promote conservation throughout their local SWCD. Usually, a SWCD consists of one to three counties. The SWCD is governed by a Board of Directors that is elected by the local citizenry. The SWCD also consists of one to three professional staff that are hired by the SWCD Board. SWCD offices are also typically co-located with the USDA's Natural Conservation Service. The SWCD Board and staff rely heavily upon the local NRCS staff and regional DCR staff for technical support.

Conservation planning can be divided into several categories: Federally required, state required, or locally required. On the national side, Title XII of the Food Security Act of 1985 , encourages participants in United States Department of Agriculture (USDA) programs to adopt land management measures by linking eligibility for USDA program benefits to farming practices on highly erodible land and converted wetlands. From the state perspective, the Department of Environmental Quality (DEQ) administers Virginia's Pollution Abatement program. Under that program, operations that meet certain animal number thresholds are required to have, as part of their VPA permit, a certified nutrient management plan. These plans are typically written and/or approved by regional DCR nutrient management specialists. DCR also, via the local SWCDs, distributes incentive funding to operators who agree to implement state approved BMPs. Additionally, at the state level, the Virginia Department of Agriculture and Consumer Services administers its Agricultural Stewardship Act. This is a complaint driven system. Should the Commissioner of VDACS find that a complaint has merit, VDACS staff, in conjunction with local SWCD staff will develop a BMP implementation schedule to correct the problem. Finally, as mentioned earlier, all owners of agricultural lands within a locally designated Chesapeake Bay Preservation Area must have a Soil & Water Quality Conservation plan. This plan must be implemented if crops are being produced within the 100' buffer.

Therefore, although there exists a broad net of conservation planning requirements, many operations do not fall under the regulatory purview of the USDA or the DEQ. Although it is difficult to ascertain concrete numbers, the NRCS estimated in it's 1994 "Analysis of Expected Farm Level Impacts of the Coastal Zone Act Reauthorization Amendments of 1990" that only 40 percent of farms in Rockingham County were USDA participants. Similarly, less than 100 of the estimated 886 dairy farms within the state are required to have a VPA permit (and associated Nutrient Management Plan). With regard to the effectiveness of the current program, Table IV-4 shows the protection of the RPA buffer based upon the content of SWQCP plans prepared under the program.

Table IV-4 Bay Act Program SWQCP and RPA Buffer Protection

	Approved		***Buffer Preserved (linear feet)***			***Buffer Acres***	
	Plans	***Acres***	***100' buff***	***50' buff***	***25' buff***	***Acres Preserved***	***Buffer Created***
FY 92	159	16,694	4,988	280,877	236,570	470	N/R
FY 93	355	16,694	4,989	280,878	236,570	470	N/R
FY 94	494	30,088	160,600	426,660	378,746	1,076	N/R
FY 95	726	41,609	279,157	67,965	260,299	868	N/R
FY 96	573	37,163	133,377	123,254	242,756	587	N/R
FY 97	590	26,065	128,864	67,260	110,931	437	N/R
FY 98	717	32,873	124,844	75,881	171,594	472	44.05
FY 99	778	33,116	100,769	35,053	190,019	381	85.86
FY00	720	22,950	57,803	21,917	94,261	212	37.15
FY01	701	24,481	45,824	56,578	115,214	236	23.77
TOTALS	***5,813***	***281,733***	***1,041,215***	***1,436,323***	***2,036,960***	***5,208***	***190.83***

While the Bay Act program's agricultural component has integrated well with the other systems in the Tidewater Area, the challenge for expansion of the program is with livestock operations. Specifically, based on the 1997 Ag Census, there are: 2.5 times more farms, 7.5 times more beef cattle, 11 times more dairies, and 3.8 times more poultry farms. The environmental issue surrounding livestock or animal farms is waste whether it is deposited directly into water courses, stockpiled on the farm, or applied on the land as a fertilizer. BMPs that address these issues are more costly to install and implement than their counterparts on cropland. In its CZARA study, the NRCS estimated that the typical BMPs needed, e.g., rotational grazing, diversions, filter strips, fencing, and alternative water, to address water quality concerns on the typical livestock farm would cost $3,520.00 (without any state cost share). By comparison, most farms east of I-95 have been able to address water quality concerns via changes in management, i.e. tillage and nutrient application rates, and have not needed to install permanent or structural BMPs, e.g. fencing, wells, waste storage lagoons, etc. In order for implementation to be successful West of I-95, state allocation of funds must follow suit.

Silviculture: The change that will occur with the proposed expansion is that local governments will have more authority regarding silviculture operations as they pertain to protection of the RPA buffer. The criteria that is contained in the Act's Regulations provides that Forestry Best Management Practices must be followed when silviculture occurs upon a designated resource protection or management area. This is particularly important where there is a RPA that is being encroached upon by logging operations. As with some of the other criteria, the need for its existence with regard to protection, or value to the environment is already established through legislative such as the Silviculture Water Quality Act. Inclusion of the criteria in the Bay Act program provides better and more effective implementation of a program that already exists. Data from 1999 showed that less than 10% of silviculture operations adhered to correctly applied Forestry Best Management Practices. With the institution of a Memorandum-of-Understanding, between the Department of Forestry and CBLAD, that explains how the complaint-based program works and what the local government's role, the number of violations in the Tidewater Area has decreased. Less violations translates into enhanced water quality.

The Buffer: A change that will occur with expansion is that within the local RPA, designated consistent with the Board's criteria, only water dependent uses, redevelopment, and some incidental uses area allowed. This limitation on land use allows for the protection of the associated water feature from pollution that would be generated from such uses and allows the buffer to perform its natural function. Maintenance of the buffer and limited passive use is allowed. Volumes have been written with regard to the benefits of buffers protecting and restoring the quality of surface waters. Public funds are expended for the protection riparian forest buffers. Conservation easements are placed upon these environmentally sensitive lands. The use of streamside buffers is an accepted and advocated practice.

In preparing this report, many testimonials with respect to the value of buffers were identified. An excerpt from the Capital newspaper, on-line edition of May 29, 2001, titled, *Chesapeake notebook: Protecting the bay on stream-banks miles away*, show the results of private efforts, some with CREP and other voluntary programs. But these would for be naught if basic regulations are not in place for a minimum buffer. Nothing more really needs to be said in terms of this report – the principle for the buffer has already been established. However an item that does need to be addressed is what are the appropriate characteristics of a buffer that should be applied in the proposed Expansion Area. This is an item that cannot be addressed in this report but would be one of the major focus points in creating new regulations that apply specifically to the proposed Expansion Area.

***The Three General Performance Requirements*:** The change that will occur with regard to what are referred to as the three general performance criteria (minimizing land disturbance, minimizing impervious cover, and preserving vegetation) is the institution of a local requirement that requires compliance with them. In general, the criteria would be established through:

- landscaping standards (minimum)
- establishing impervious (lot) cover standards
- review of grading plans with the purpose of eliminating unnecessary land disturbance.

The increment of change is not identifiable since it will vary with the practices of each locality. Some localities in the proposed Expansion Area already practice all of the above, some do so partially, and others do not address the items at all. The locality survey shows that there is wide variation among localities that accommodate flexibility that would help to preserve environmental features or to require practices that help in protecting water quality. Through the comprehensive and integrated approach envisioned by compliance with the Act, the natural hydrology of a site can be more closely adhered to resulting in preserving natural environmental functions and reducing the costs of development. Programs to comply with these requirements could run from simple standards to involving low impact development and similar design based development that preserves natural features and the natural hydrologic functions of a site.

Plan of Development Review Process Requirements and Water Quality Protection Measures in Local Land Development Regulations: The change that will occur with the expansion is that a plan of development review process will be required for all land disturbance exceeding 2,5000 sq. ft. and proposed development in a RPA . This process ensures that water quality matters are addressed during the planning stages. It also requires that specific performance standards are reviewed and subject to public review. The increment of change is not identifiable since it will vary with the practices of each locality.

An aspect of this review requirement that will affect almost all of the development that occurs is that of the required Water Quality Impact Assessment (WQIA) for any proposed development in a RPA. The WQIA requirement is permissive throughout the

RMA. The WQIA establishes a program for evaluation of a development proposal with regard to water quality and hydrologic implications. It identifies appropriate mitigation that must be complied with. Consideration of water quality items, through compliance with the performance standards, in the plan of development review process is required. By having a program for evaluation of a development proposal with regard to water quality and hydrologic implications, appropriate mitigation is identified and applied; thus, enhancing water quality.

Associated with this performance criteria is the need for local zoning and subdivision regulations to address water quality as a part of the development review process. Thus, each locality will have a regulatory program to protect the quality of state waters. The result of having such regulations are shown in enhanced environmental quality. The final aspect of the development review process is that of insuring that development occurs as approved on the plans. This involves local monitoring and enforcement programs. For violations, especially within the buffer, a process is required for the administration of waivers, exemptions, modifications, and for processing exceptions.

Because the overall program is mandatory, it is expected that there is dutiful compliance. Adequate enforcement of environmentally based statutes is necessary to achieve the environmental goals that the regulations are to achieve.

***Water Quality Considerations in Comprehensive Plans*:** Local comprehensive plans will need to address water quality per guidance issued by the Board. The locality survey showed that most local plans had an environment element with varying degrees of content. It showed that less than 2/3rd addressed water quality at all. And, less than 20% addressed planning in a watershed context.

The value of water quality planning is already established in the Commonwealth as a specifically identified permissive component of any comprehensive plan and as a requirement in Tidewater Virginia. The value of watershed based planning is recognized by the Commonwealth's commitment, through the Bay Program, to have watershed management plans in two-thirds of the Chesapeake Bay watershed. Through these programs and processes there is a raising of awareness of water quality and development issues. And, by its very nature, such planning ensures environmental considerations are assessed and protected in a manner consistent with local goals and objectives. The results in localities that do good environmentally based planning show in the enhanced environmental quality of their communities. Also, the watershed based planning that is encouraged as an appropriate way to address requirements of the Act is a viable and accepted way to address water quality requirement imposed through federal regulatory programs and is essential for de-listing of impaired waters.

Summary/Conclusions

A major point from the exploration of the environmental benefits of expansion of the Act is that it is not the Bay, per se, but the tributaries, the headwater streams, and all the waters of the state that will benefit. As each of the headwater streams, that flow into the

tributaries, that flow into the Bay increase in their health and water quality so will the Bay.

This aspect, Chapter IV, of the study is not one of all the environmental benefits but is more general with regard to the general benefits/impacts pertaining to enhanced water quality along with a more specific assessment relative to the performance criteria in the Regulations. Thus, given the magnitude of this existing commitment, the question is not whether there is a benefit to the environment of expanding the current Bay Act program but whether doing so is an effective, efficient, and appropriate way to protect and enhance the quality of state waters. An answer to that proposal is graphically illustrated in Figure IV-1 which shows that within the Tidewater Virginia area, the number of miles of impaired streams is dramatically less than in the balance of the watershed (the proposed expansion area) or outside the watershed. This fact is even more startling when viewed in concert with Figures V-1 and V-2 in Chapter V that show 2/3^{rds} of the population lives in Tidewater while it has only 1/4th of the land area. Given that the myriad of state-based environmental programs are applied state-wide and the current Chesapeake Bay Act program applies exclusively to Tidewater Virginia it appears that during its twelve years of existence, it has had a disproportionate and positive effect upon protecting and enhancing the quality of state waters. This fact puts the focus upon the key aspect of the Act – that it is a mandatory as opposed to a voluntary program. Education and incentive based, voluntary programs may be a preferred way to approach many problems; however, in addressing the need to protect the quality of state waters the mandatory program, as implemented through CBLAD, appears to not only be effective in its results but it does so at a direct dollar expense to the Commonwealth that is significantly less than the wealth of voluntary, educational, and short-term programs that exist.

A significant perspective, described in the study, is that of emphasizing the total integrated system of the bay, its tributaries, and the streams that feed the tributaries. This concept is reinforced by numerous articles and reference documents that framed the issue as "saving the Bay by saving watersheds". From that concept, a suggestion was made that if a new program were created for the proposed Expansion Area it should be named in that manner, perhaps, along the lines of the Chesapeake Bay Rivers Act/Program. It was also noted that the language of the current Act addresses the protection of the quality of state waters and does not refer specifically to the Bay except in connection with the rivers that feed it.

It is noted that a cost/benefit analysis cannot be applied to the effects of the criteria due to the nature of the issues. Also, the need for developing an expansion program in concert with the activities and programs of other agencies in order to avoid redundancy and inefficiencies was evident.

The commitments that the Commonwealth has made through participation in the original Chesapeake Bay Agreement and its subsequent revisions essentially mandate to the Commonwealth that the goals, purposes, and program established for the Bay Act be expanded to the balance of the watershed. The original Bay Agreement called for a

watershed wide program that focused upon the land use based approach as practiced through the Bay Act. In assessing the year 2000 Bay Agreement, there are commitments specific to concepts of sound land use that are only addressed, in Virginia, through the CBLAD program. Finally, the direction of the overall Bay Program has gone through a recent shift from measuring nutrient loads to the establishment of environmental end-points that support living resources. This concept shifts the need for water quality protection programs to not only deal with the mechanics of erosion and sediment controls, controlling septic discharge, and structural stormwater best management practices but also to include low impact development and better site design practices. The current Bay Act program advocates for such practices and they are addressed through the program's local implementation review component.

In conducting the study and reviewing the gathered information, it became apparent that the current Bay Act program presents a unique approach to controlling nonpoint source pollution through its focus upon the land use connection and in the long-term context of comprehensive and land use planning. The benefit of the Bay Act program approach, wherein a locality's approach is applied in an integrated and comprehensive framework as opposed to compliance with, or imposition of, a singular requirement, emerges as an underlying principle that needs to be applied in order to achieve desired water quality goals.